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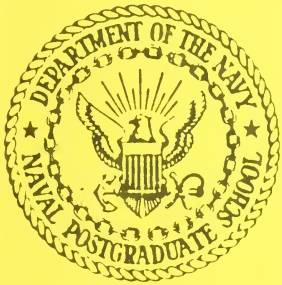

THE OZDRAW USER'S MANUAL

Steven Firth

Michael J. Zyda

January 1986

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OZDRAW is an interactive figure generation system designed to operate on the IRIS 2400 workstations manufactured by Silicon Graphics Inc, of Mountain View, California. OZDRAW was written in 1985 at the Naval Postgraduate School in the Graphics and Video Laboratory of the Department of Computer Science.

The aim of OZDRAW is to provide a powerful, yet friendly, general purpose figure generation system to allow untrained users to produce high quality figures that can be used for presentations, technical papers and academic

theses. OZDRAW has been designed so that the user can efficiently operate the system with little or not experience. The system uses pop-up menus to provide the user with the available instructions; menus use text rather than icons to provide an interface that is less ambiguous to the inexperienced user.

THE

OZDRAW USER'S

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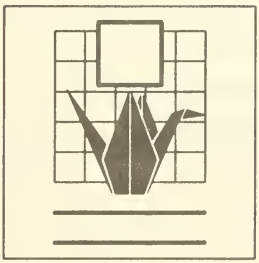

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INTRODUCTION TO THE SYSTEM

OZDRAW is an interactive figure generation system designed to operate on the IRIS 2400 workstations manufactured by Silicon Graphics Inc, of Mountain View, California. OZDRAW was written in 1985 at the Naval Postgraduate School in the Graphics and Video Laboratory of the Department of Computer Science.

The aim of OZDRAW is to provide a powerful, yet friendly, general purpose figure generation system to allow untrained users to produce high quality figures that can be used for presentations, technical papers and academic theses. OZDRAW has been designed so that the user can efficiently operate the system with little or no experience. The system uses pop-up menus to provide the user with the available instructions; menus use text rather than icons to provide an interface that is less ambiguous to the inexperienced user.

The system requirements for OZDRAW are:

(1) an IRIS 2400 workstation, ideally with three megabytes of memory and a floating-point accelerator, and

(2) the IRIS mouse

(3) a graphics printer capable of quality graphics production; a laser printer is the preferred printer.

This manual is divided into the following three sections:

(1) Section One - a **very** quick overview of the system,

(2) Section Two - detailed description of the system, and

(3) Section Three - a discussion of the particular printer currently in use.

SECTION ONE - A QUICK OVERVIEW.

This section is designed for the new user who wishes to know the bare minimum to operate the system. This section is not recommended for those users inexperienced with computer systems, especially computer graphics systems. For these users it is recommended that a reading of Section Two and Three would be more appropriate.

OZDRAW is envoked by the command:

ozdraw

Note, no command line arguments are accepted.

OZDRAW allows two alignments of the page, either vertically or horizontally. Choice of an alignment for a series of figures is not binding; by writing figures to a file and then back into the system the alignment can be changed at any time.

OZDRAW is almost completely menu-driven; that is all choices are by selection of menu items, not by typed commands. At various times the menu selections are augmented by key-strokes on the keyboard. At all times OZDRAW displays the functions of the mouse buttons and the active keys on the screen.

An interactive edit facility is provided by OZDRAW so mistakes during drawing can be quickly and easily rectified.

Once completed, the figures must be stored in a file for later printing. OZDRAW **does not** print the file directly. A directory listing facility is provided to enable the user to view the files contained in his current directory. This facility cannot be used to view any other directory.

To print the file produced by OZDRAW issue the command:

ozprint -alignment filename [-alignment filename]

where alignment is : v for a vertical alignment, and
h for a horizontal alignment.

SECTION TWO - A DETAILED DESCRIPTION.

The following section will give a detailed description of the operation and capabilities of OZDRAW. It is recommended that for a complete coverage of OZDRAW that Section Three also be read in addition to this section.

FIGURES SUPPORTED BY OZDRAW.

OZDRAW supports the following figures:

(1) polygons, including rectangle and squares;

(2) circles and ellipses;

(3) single and continuous lines;

(4) arcs;

(5) a seed point to fill unconvenntional objects;

(6) lines of text; and

(7) arrow heads.

For a description of the procedure to draw these figures, refer to the section "Drawing a Figure".

OZDRAW FIGURE ATTRIBUTES.

OZDRAW supports four basic attributes:

(1) linewidth,

(2) linestyle,

(3) texture for filled figures, and

(4) text fonts.

These attributes are totally dependent on the printer currently being used. For a listing of possible attributes refer to Section Three.

Initially OZDRAW has the attributes set to the following values:

(1) Linestyle - continuous line,

(2) Linewidth - one pixel width,

(3) Texture - a clear texture, and

(4) Font - 6 lines per inch, 10 characters per inch.

The IRIS workstations provide only one pre-defined font. Therefore, all but one of OZDRAW's selectable fonts cannot be displayed as they would on the printed page. To partially overcome this limitation OZDRAW does the following. When any font is selected, other than the default font (see Section Three), a red rectangle is shown around the text. This rectangle represents the area that the text will occupy on the printed page. Note, this displayed rectangle can either be larger or smaller than the displayed text.

For similar reasons OZDRAW does not realistically display all the textures that can be printed. OZDRAW will certainly display a clear texture as such, but most of the other textures will be displayed as one set texture. For a graphical representation of each texture, see the printer supplement at the end of this manual.

To change attributes refer to the section "Changing Attributes."

THE PRINTED PAGE SIZE.

OZDRAW is designed to produce figures for a standard paper size (8.5"x11"); this size cannot be changed. OZDRAW allows the user to print the page either vertically or horizontally; that is either 8.5 x 11" or 11 x 8.5" respectively.

THE IRIS MOUSE AND CURSOR.

OZDRAW uses mainly the mouse, and to a lesser extent the keyboard, for user input to the system. For instance selection of menu choices is done via the mouse.

The IRIS mouse has three buttons associated with it; these are located on the upper side of the mouse. These buttons are referred to in this manual and by OZDRAW as the Left, Middle and Right mouse buttons. Their individual locations are thus self-explanatory. Moving the mouse across the surface of the work-desk (or any appropriate surface) moves the position of the cursor on the terminal screen. The cursor can appear as a small pencil when in the drawing mode, or as a red square when the user is being asked to select an answer to a prompt. A description of menu items will follow later in this manual.

Sometimes when pressed the mouse buttons give a "double-bounce", that is it appears to the system that the user has pressed the mouse button two, or more, times. This occurrence can be annoying as it may produce results that are not expected. Therefore it is advised that the mouse buttons be pressed in a crisp, sharp manner to avoid this problem.

STARTING OZDRAW

OZDRAW is envoked by the command:

ozdraw

Note; no command-line arguments are used. For the path-name to locate OZDRAW within your system consult your local system management.

When beginning the drawing process, OZDRAW will prompt the user for the page alignment. This alignment can be either vertical or horizontal; this choice is represented graphically so no confusion should arise.

Choice of page alignment is not binding; at any time during the drawing process the user can change alignment by writing the figures to disk, changing the page alignment and then reading the figures back into the system.

SCREEN LAYOUT.

During the drawing process OZDRAW displays a portion of the intended printed page as well as system information and prompts. For more information on the later, refer to the section "System Prompts".

OZDRAW does not display the entire page; only 8.5 x 8.4" of the page is seen at any one time. When using a horizontal page alignment the entire height is seen, but not all of the width. When using the vertical page alignment vice versa occurs; all of the width is seen, but no all of the height. When in a drawing or an edit function the page can be moved around, via the Arrow keys on the keyboard.

Initially OZDRAW displays a grid overlaying the page; for a description of this grid refer to the section "The Grid Overlay" in this manual.

Superimposed on the page is a red dotted rectangle. The area within this rectangle is NOT the entire page; this line represents what generally is regarded as the correct margin settings for normal use. The choice of the size of this rectangle reflects the page layout dimensions required for a thesis page at the US Naval Postgraduate School. OZDRAW does not place any restrictions on where the user draws on the page; if required, the user can draw outside the boundaries of this rectangle, up to the border of the page itself.

SYSTEM PROMPTS.

During the drawing process OZDRAW allocates the right-hand side of the screen for system information and prompts. The inexperienced user is recommended to refer to these prompts throughout the drawing process.

The information/prompts displayed, listed in order from the top of the screen, are:

(1) File In Use - displays the file that is currently being produced/edited. This name is set when a file is read into the system; if no file has been read in then this area is blank.

(2) Cursor Position - displays the current position of the cursor, measured in inches, from the lower left-hand corner of the screen. If the cursor is not in use then 0.0, 0.0 is displayed. Note, this display is for information only and does not have any effect on the cursor positioning.

(3) Main Menu - as the name implies this is the main menu for the entire system. The functions selected from this menu will be described later in this manual.

(4) Key Functions - displays which keyboard keys are active at any one time. If a key is not listed then it is not active; pressing an inactive key will have no effect.

(5) Mouse Functions - lists the functions of the three mouse buttons. The buttons are identified by black squares (representing the button), with a letter inside it. The letter "L" represents the left mouse button, the letter "M" the middle and the letter "R" the right mouse buttons.

THE GRID OVERLAY.

OZDRAW has the facility to overlay the displayed page with a grid. This grid is there to aid the user align figures on the page: this grid is not printed on the paper copy. This grid can be altered by the user; this option is selectable from the Draw Menu.

The allowable settings of the grid are:

(1) not displayed,

(2) each grid equals one-half inch, and

(3) each grid equals one-quarter inch. (the initial setting)

The grid is displayed in a green colour with the half inch grid having a thicker linestyle to distinguish it from the quarter inch grid.

THE MENU STRUCTURE.

The user inputs commands to OZDRAW via a series of pop-up menus. These menus are organised in a hierarchical structure, as detailed in Figure 1.

Selection of a menu command is done via the mouse buttons. The outside mouse buttons (left and right buttons) scroll the highlighted command up or down. This scrolling can be done with a series of individual mouse hits, or the button can be held down for continuous scrolling. Once the correct command is highlighted it can be selected with the middle mouse button. At all times the mouse button functions are displayed at the bottom right-hand corner of the screen.

DRAWING A FIGURE.

To commence drawing select the "draw" option from the Main Menu. Once selected a series of boxes will appear at the top of the displayed page. Inside each box will be text that describes the function that can be selected from this box. At this stage the cursor will appear as a red square; to select a box place the cursor over the box and press the middle mouse button. The available choices are:

(1) **Draw a Figure** - draw a figure that is not a line, for example a circle, ellipse or rectangle,

(2) **Draw a Line** - draw a line, including arcs,

(3) **Write a Line of Text** - self-explanatory,

(4) **Single Edit** - explained in the section "The Interactive Edit Facility",

(5) **Block Edit** - as above,

(6) **Attributes** - refer to the section "Changing Attributes",

(7) **Toggle Grid** - to change the grid overlay, see the section "The Grid Overlay", and **Exit to Main Menu** - self explanatory.

Once selected a further menu, similar to the main menu will appear on the screen, prompting the user for a further choice. As always the functions of the mouse buttons will be displayed at the right side of the screen.

All drawing function differ slightly in operation but are basically similar. To begin drawing the middle mouse button is pushed; to finish the middle button is again pushed. As usual the functions of the mouse buttons are always displayed. All functions are easy to use and most users are comfortable with the drawing process after several minutes of experimentation. However for completeness the following quick description of the procedure to draw each figures is given:

(1) **Rectangles** - press the middle mouse button to drop the first corner of the rectangle, move the cursor to draw the rectangle and press the middle mouse button when finished.

(2) **Circles** - press the middle mouse button to choose the centre of the circle, move the cursor until the circle is drawn, then press the middle mouse-button again.

(3) **Ellipses** - press the middle mouse button to drop the first corner of a rectangle that will later contain the ellipse, move the cursor to draw the rectangle, and when finished press the middle mouse button; the ellipse will now be drawn.

(4) **Arcs** - press the middle mouse button to choose the centre of the arc, move the cursor to draw the circle, press the middle mouse button when the correct radius is selected, then press the middle mouse button to select the start of the arc, move the cursor counter-clockwise and press the middle mouse button to select the angle of the arc.

(5) **Polygons** - press the middle mouse button to drop the first point of the polygon, move the cursor and press the middle mouse button again to select subsequent points, when complete press the left mouse button.

(6) **Arrow Head** - select the position of the arrow head by pressing the middle mouse button, select the direction of the arrow by aligning the line from the cursor, press the middle mouse button when complete and the arrow head will be drawn.

(7) **Text** - choose the starting position for the text with the middle mouse button, type in the text followed by pressing the RETURN key, carry out the final positioning of the text, when complete press the middle mouse button.

(8) **Seed Point** - select the position of the seed point my pressing the middle mouse button, the seed point will have the texture that is currently set.

(9) **Single Lines** - select the first point using the middle mouse button, move the cursor to complete the line and press the middle mouse button.

(10) **Continuous Lines** - select the first point using the middle mouse button, move the cursor and the middle mouse button to drop other points, when finished press the left mouse button.

During the drawing process the last figure of the type being drawn can be deleted my pressing the DELETE key on the keyboard. For example, while drawing circles the user decides the last circle he drew was not suitable, he can erase this circle by using the DELETE key. It is not an error to try to erase a figure that does not exist.

Also during the drawing process, the user can reproduce the last figure drawn by pressing the left mouse-button. That is if the user is in the ellipse drawing function he can reproduce the last ellipse drawn by pressing the left mouse button. The new figure is drawn at the current position of the cursor and can then be moved about to position it in the correct place.

A word of warning: the IRIS workstation cannot fill a concave polygon. When drawing a polygon with a filled texture the user is advised that unpredictable results may occur.

THE INTERACTIVE EDIT FACILITY.

The edit functions are selected via the Main Menu option "draw". Once this is selected text boxes appear at the top of the displayed page. For a complete description of all the choices refer to the section "Drawing a Figure." There are two edit choices: Single or Block Edit.

Single edit offers the following choices:

(1) Move a single figure,

(2) Remove a single figure,

(3) Recover a single deleted figure, and

(4) Reproduce a single figure.

Selection of individual figures is done by positioning the cursor over the "control point" of required figure and pressing the middle mouse button (an explanation of control points will follow later). If an object was found OZDRAW will cause the figure to blink; if the blinking figure is correct the user confirms this by pressing the middle mouse button. If it is the incorrect figure the user rejects it by pressing either of the outside mouse buttons. If no figure was found then an error

message is displayed. Once a figure has been selected then the required editing action is carried out.

Block edit choices are as follows:

(1) Move a block of figures,

(2) Reproduce a block of figures,

(3) Remove a block of figures, and

(4) Move the entire page.

Selection of a block is carried out by the user drawing a special rectangle around the required figures. If any figure has a control point inside this rectangle it will be selected. Once selected the edit action is carried out.

The control points for the various figures are as follows:

(1) **Polygons and Rectangles** - any corner.

(2) **Circles and Ellipses** - the centre point.

(3) **Arcs** - either end point.

(4) **Text** - the first letter.

(5) **Lines** - any end point or internal junction.

(6) **Seed Point** - the centre point.

Moving the entire page is straightforward; the page is reduced so that the user can see the entire page, and via the arrow keys all the figures on the page are moved about. This option is particularly useful when the user has finished drawing his figures and wishes to centre them on the page.

Another function carried out by OZDRAW that could be classed as an edit function is to change an attribute on a previously drawn figure. This function is not chosen from the Single Edit menu, but instead chosen from the Attribute Menu. The selection of the figure is done via the above method for choosing single figures.

CHANGING ATTRIBUTES.

To change the current set attributes choose the Attributes text box at the top of the displayed page. Once selected the Attribute Menu will be displayed, from which the appropriate attribute can be selected to change.

Individual figures that already have been drawn can be have their attributes altered from

this menu. Refer to the section "The Interactive Edit Facility" for a full description of this option.

QUERYING ATTRIBUTES.

OZDRAW allows the user to query attributes set either of a particular figure or of the current set attributes.

The facility to view the set attributes of a particular figure is selected from the Attribute Menu. The user selects the figure by placing the cursor over a control point (see the section "The Interactive Edit Facility" for a discussion of control points) and pressing the middle mouse button. The attributes of that figure are then displayed on the screen.

The facility to view the values set for the current attributes is selected from the Attribute Menu. Once selected the current settings are displayed on the screen.

ERASING THE PAGE.

Erasing the entire page can be done two ways:

(1) remove individual figures, one at a time, using the interactive edit facility, or

(2) erase the page in one function; this function is selected from the Main Menu.

Note, erasing the entire page using the second option resets all attributes to their default values. For the value of the default attributes refer to the section "OZDRAW Figure Attributes."

READING AND WRITING A FILE

To print a file or save a drawing, the figures need to stored in a file. Naturally there is a facility to retrieve this drawing from a file. A directory listing facility is also provided; this facility can only list the files contained in the users current directory. Both the Read and Write operations are selected from the Main Menu. Both operations are similar in format; the user is prompted for a file name which is typed at the keyboard.

If the user wishes to read a file OZDRAW checks two conditions:

(1) OZDRAW checks if the file exists; if it does not exist an error has occurred and the user is informed.

(2) OZDRAW checks if any figures are displayed on the screen. If there are, OZDRAW asks the user if he wishes to discard the displayed figures or to merge the two drawings.

If the user is writing to a file, OZDRAW checks if the file exists. If it does not then the file is created and the figures written to that file. If, however, the file does exist, the user is asked if he wishes to append the figures on the end of the file, or if he wishes to overwrite the file. Note, if the user chooses to overwrite the file the old contents are destroyed; be careful when overwriting a file.

PRINTING A FILE.

OZDRAW itself **does not** actually print the figures produced by the user. Instead OZDRAW produces a file, named by the user, that can be printed later by a print utility called, not surprisingly enough, **OZPRINT.** (For those interested all printer dependent functions are carried out by this utility; OZPRINT must be altered for different printers that are used with OZDRAW.) Consult local system management for the location of OZPRINT in your system.

The method to print a file produced by OZDRAW is to issue the following command:

ozprint -alignment filename [**-alignment filename**]

where alignment is : h for horizontal, and
v for vertical.

Note that more than one file can be printed in this manner, as long as the correct number of alignment values are placed in the appropriate places.

For example to print the file junk1.dwg, with a vertical alignment, as well as file junk2.dwg, with a horizontal alignment, the following command would be issued:

ozprint -v junk1.dwg -h junk2.dwg

FILE FORMAT.

OZDRAW stores the user produced figures in a file that uses ASCII characters. The actual file format is readily understandable by inspection of any OZDRAW file, so no further description will be given here.

Using an ASCII file format gives the following advantages:

(1) the OZDRAW file can be edited by the user using any suitable text-editor; this approach is certainly only recommended for the experienced user as errors can produce unpredictable results,

(2) transferring binary files between systems, such as between the IRIS and VAX 11/780, can be messy if systems use different sized data types, and

(3) the ASCII format lends itself to other programmes producing complex figures, for use with OZDRAW, that would normally be impractical to draw with OZDRAW.

EXAMPLES OF FIGURES PRODUCED USING OZDRAW.

The next four pages are included to show to the new user what OZDRAW is capable of. These figures were produced by students (other than the author) for their academic theses.

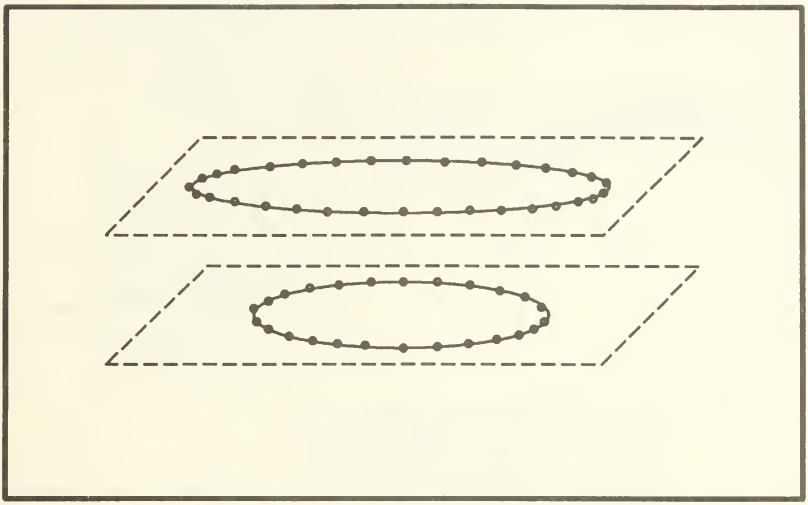
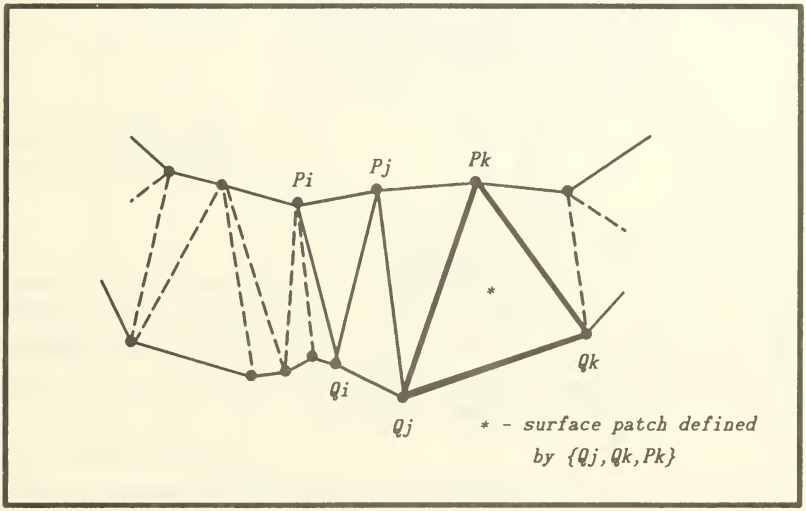


Fig 1.1 - Two contours on adjacent, parallel planes



Example 1

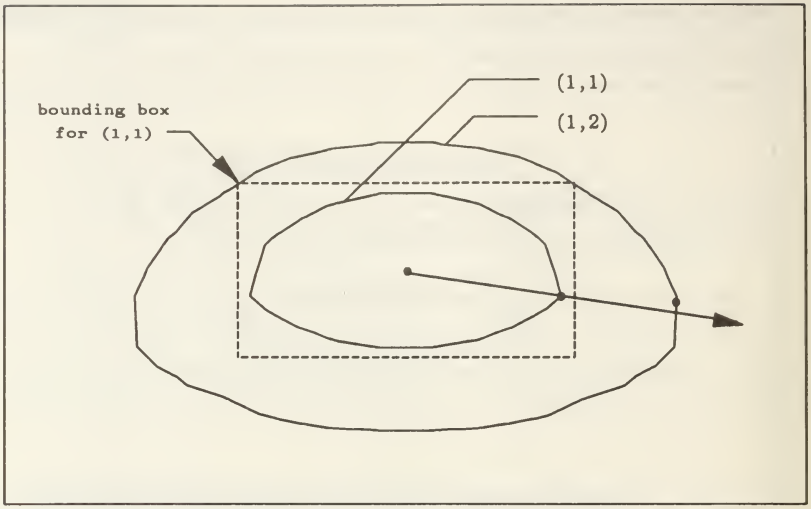
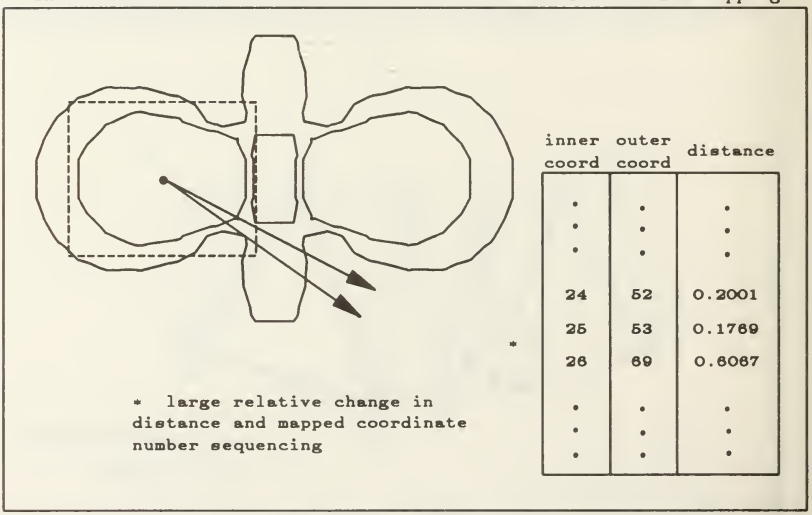


Fig. 3.10 - Vector radiating from center coordinate through the interior coordinate towards the outer contour for tentative mapping



Example 2

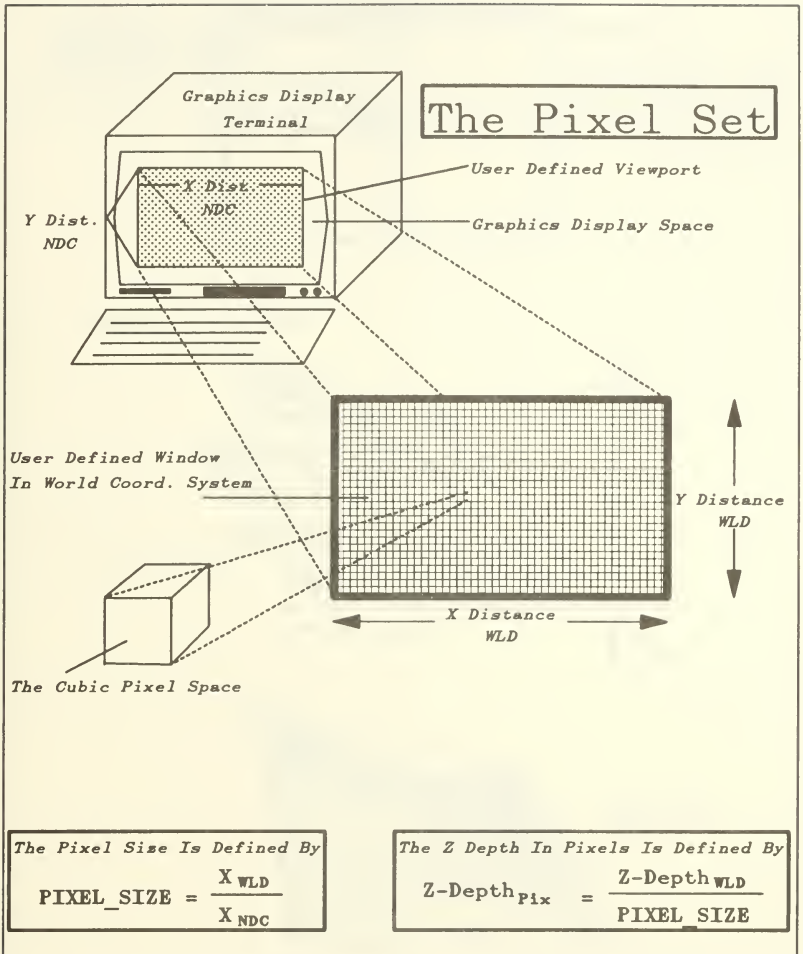

Graphics Display Terminal
The Pixel Set
X Dist. NDC
Y Dist. NDC
User Defined Viewport
Graphics Display Space
User Defined Window In World Coord. System
Y Distance WLD
X Distance WLD
The Cubic Pixel Space
The Pixel Size Is Defined By
PIXEL_SIZE = X WLD / X NDC
The Z Depth In Pixels Is Defined By
Z-Depth Pix = Z-Depth WLD / PIXEL_SIZE

Figure 3.2. Normalizing the Pixel Space.

Example 3

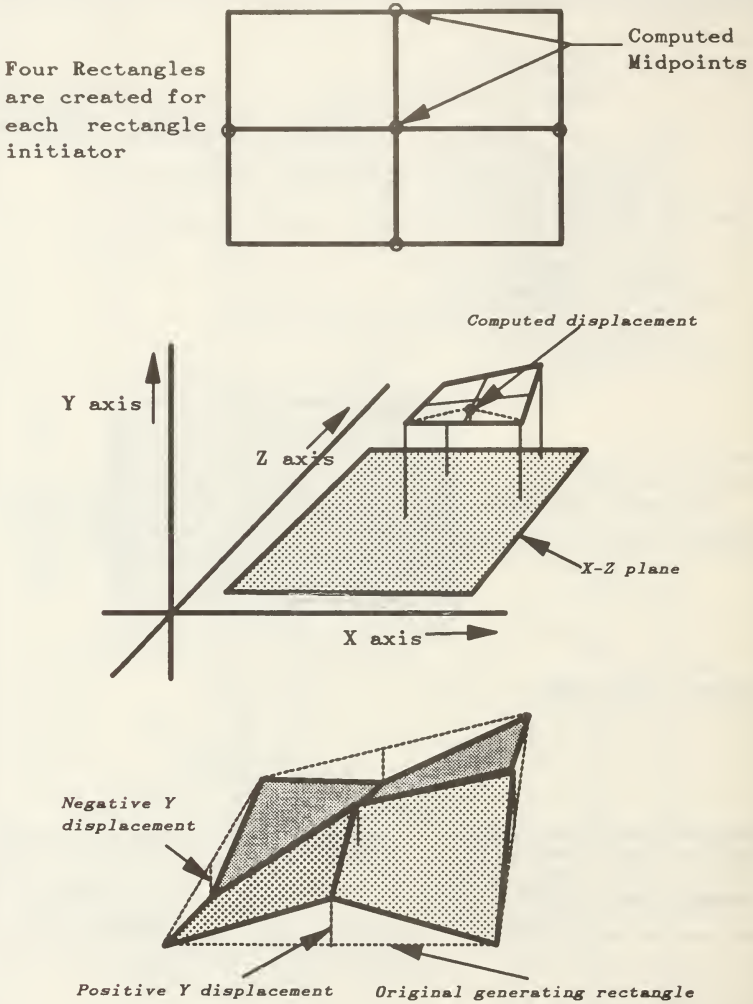


Figure 6.1. The Rectangular Midpoint Displacement.

Example 4.

SECTION THREE - PRINTER DEPENDENT INFORMATION

The following is included as a supplement to detail the requirement and capabilities of the printer currently being used with OZDRAW. This section will be maintained by local personnel.

THE OZDRAW

QMS LASER PRINTER

SUPPLEMENT.

OZDRAW AND THE QMS LASER PRINTER.

This supplement to the OZDRAW is designed to detail the various attributes used with the QMS Laser Printer, as well as alerting the user to local peculiarities.

Attributes.

Currently OZDRAW can use the following attributes of the QMS laser printer:

(1) four linestyles,

(2) five linewidths,

(3) sixty-one fonts, and

(4) twenty-seven textures.

For a graphical display of these attributes see the end of this supplement.

The Seed Point

When dropped a seed point will fill up to either the boundary of the page, or a solid line. Use this facility with caution as an error may have strange results. For example dropping a seed point inside a rectangle with a dotted boundary will cause the entire page to be filled.

OZPRINT

The print utility OZPRINT is in reality a driver programme that uses the FIG drawing system to draw the user's figures. OZPRINT parses the parameters and then calls FIG and spawns it into the background.

A source of error is calling OZPRINT twice, or more, in rapid succession. This error is caused by FIG using a scratch file to store some intermediate data. When more than one OZPRINT is executing at one time, collisions over this scratch file may occur, thus leading to errors.

Therefore to avoid this error allow several minutes between calls to OZPRINT. This should not be too inconvenient as OZPRINT allows more than one file to be printed at a time. Refer to the OZDRAW Users manual for further discussion.

Drawing a Filled Figure.

When drawing a filled figure there are two considerations to be taken into account:

(1) OZPRINT cannot print a filled concave figure, due to the fill algorithm it uses. Unpredictable results may occur if this is done.

(2) Printing a figure that is filled with a dotted boundary will cause more than that figure to be filled. The algorithm in use fills up to the edge of the page or to a continuous line.

If a filled concave figure is required then the following procedure can be used:

(1) set the texture to clear, that is the value equal to 1,

(2) ensure the linestyle is continuous, that is the value equal to 1,

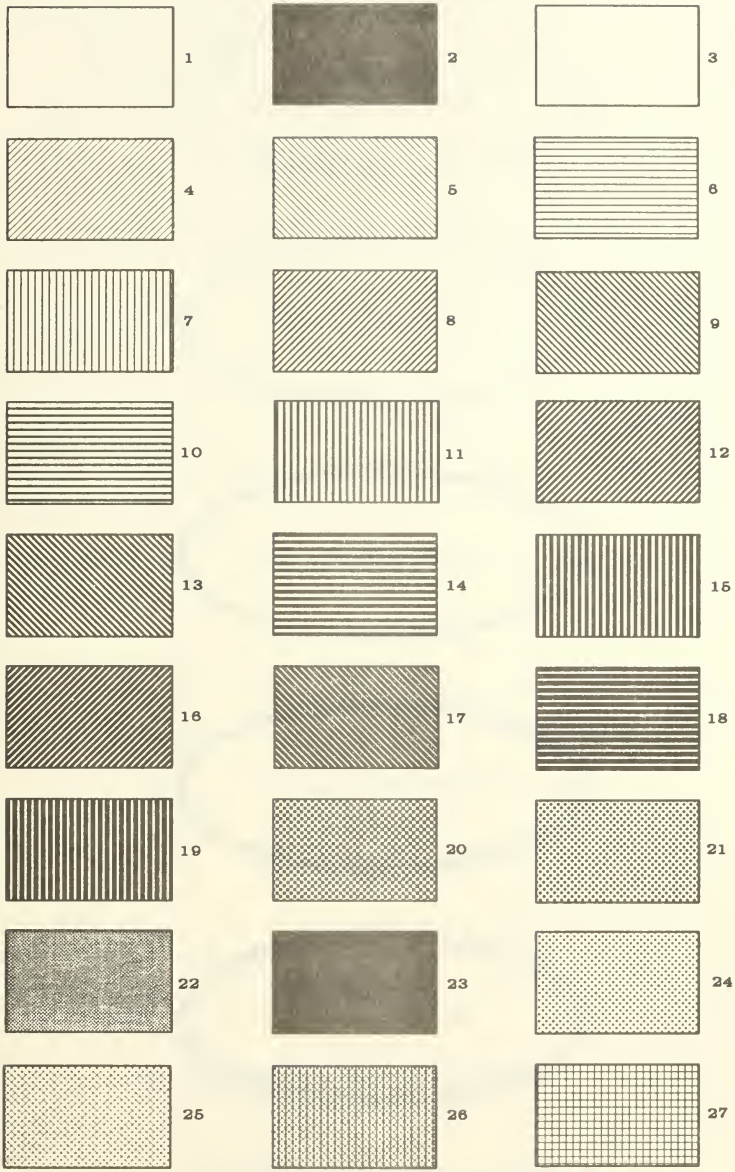
(3) draw the required concave figure,

(4) set the texture to the required fill pattern,

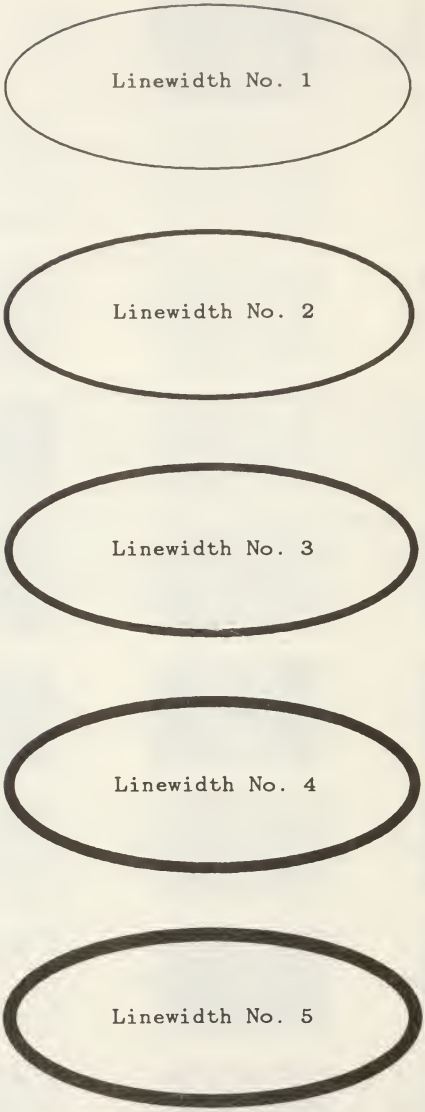
(5) drop a seed point inside the concave figure.

Clipping of Figures

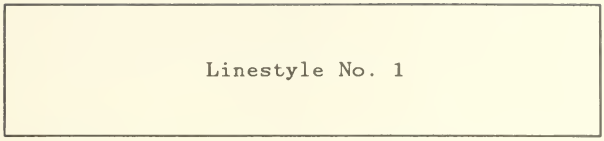
The user is to be aware that OZDRAW does not undertake any clipping of figures produced during a drawing session. Therefore the figure produced may be stored in the file with portions of this figure lying outside the bounds of the page. Certainly there is no problem with this, but when the user attempts to print the figures on the QMS unpredictable results may occur. It appears that the QMS printer can handle figures that overlap the right-hand and the top edges. However, the lower and left edges are not as understanding; unpredictable therefore results may occur on these two edges if figure project off the page.

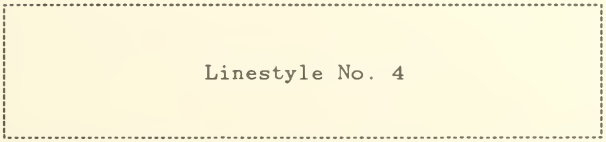


AVAILABLE TEXTURES FOR OZDRAW



OZDRAW'S AVAILABLE LINEWIDTHS





AVAILABLE OZDRAW LINESTYLES

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  ! " # $ % & ' ( ) * + , - . / 0 1 2 3 4 5 6 7 8 9 : ; < = >
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@ A B C D E F G H I J K L M N O P Q R S T U V W X Y Z [ \ ]
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@ A B C D E F G H I J K L M N O P Q R S T U V W X Y Z [ \ ]
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` a b c d e f g h i j k l m n o p q r s t u v w x y z { | } ~
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` a b c d e f g h i j k l m n o p q r s t u v w x y z { | } ~
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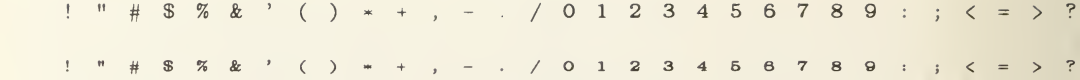

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B C D E F G H I J K L M N O P Q R S T U V W X Y Z [\ ] _

b c d e f g h i j k l m n o p q r s t u v w x y z { | } ~ ■

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b c d e f g h i j k l m n o p q r s t u v w x y z { | } ~ ■

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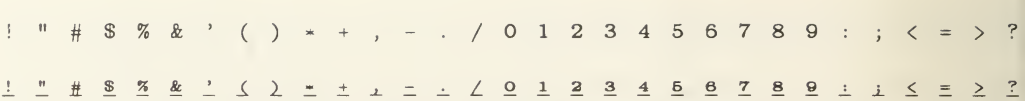
FONT 13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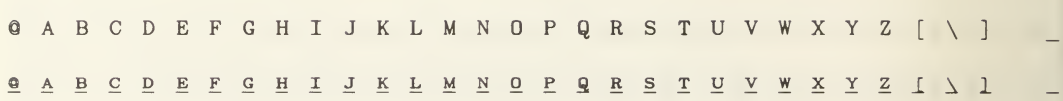
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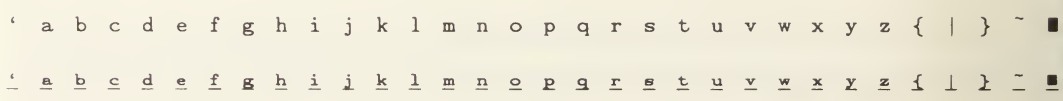
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A B C D E F G H I J K L M N O P Q R S T U V W X Y Z [\ ] _

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z [\ ] _

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A B C D E F G H I J K L M N O P Q R S T U V W X Y Z [\ ] _

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z [\ ] _

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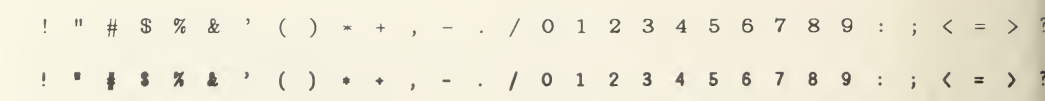

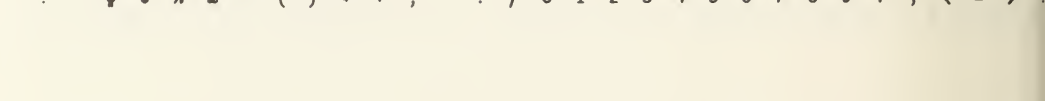

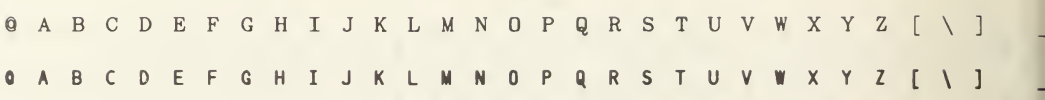

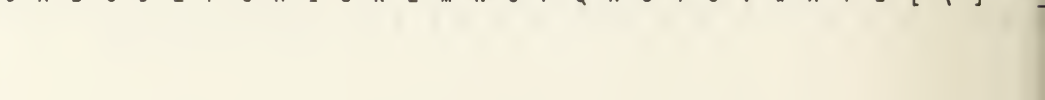

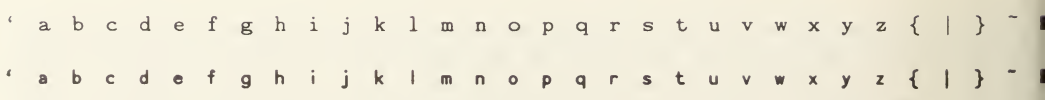

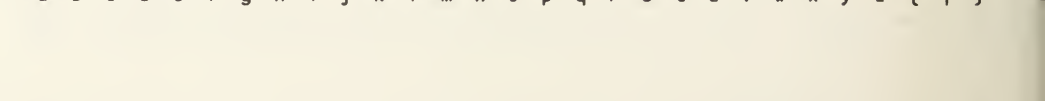

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` a b c d e f g h i j k l m n o p q r s t u v w x y z { | } ~

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FONT 26

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B C D E F G H I J K L M N O P Q R S T U V W X Y Z [\ ] _

b c d e f g h i j k l m n o p q r s t u v w x y z { | } ~ ■

b c d e f g h i j k l m n o p q r s t u v w x y z { | } ~ ■

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` a b c d e f g h i j k l m n o p q r s t u v w x y z { | } ~

` a b c d e f g h i j k l m n o p q r s t u v w x y z { | } ~

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b c d e f g h i j k l m n o p q r s t u v w x y z { | } ~ ■

b c d e f g h i j k l m n o p q r s t u v w x y z { | } ~ ■

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@ A B C D E F G H I J K L M N O P Q R S T U V W X Y Z [\ ]

` a b c d e f g h i j k l m n o p q r s t u v w x y z { | } ~

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A B C D E F G H I J K L M N O P Q R S T U V W X Y Z [\ ] _

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z [\ ] _

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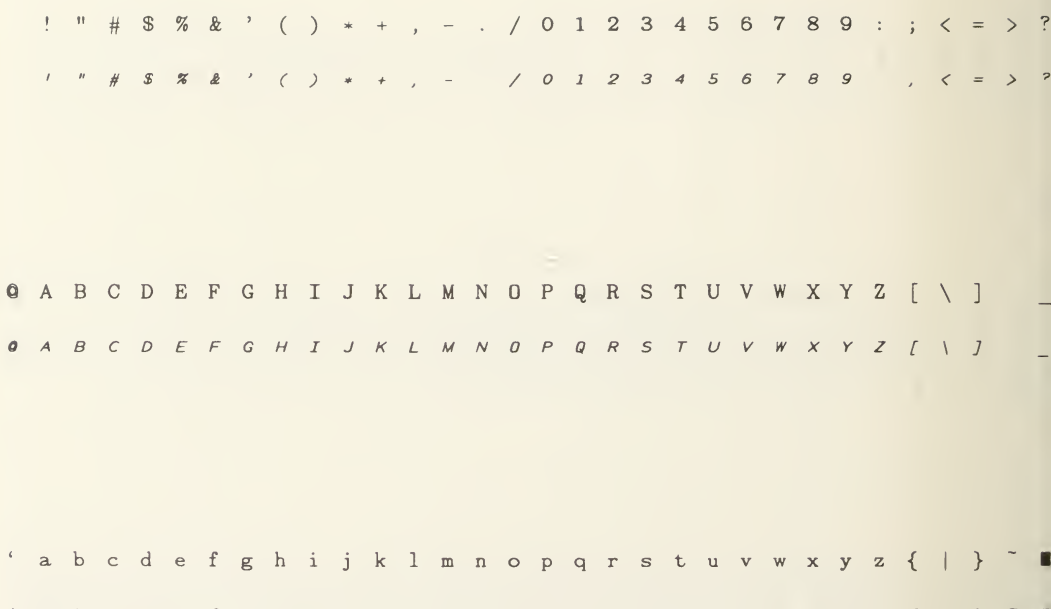
FONT 31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FONT 32

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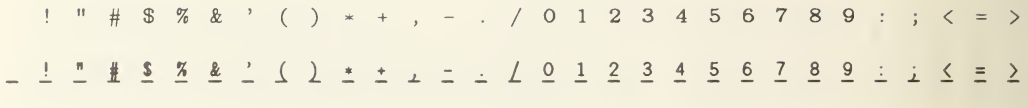
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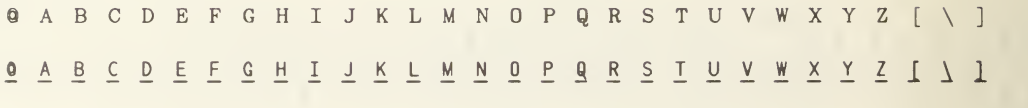
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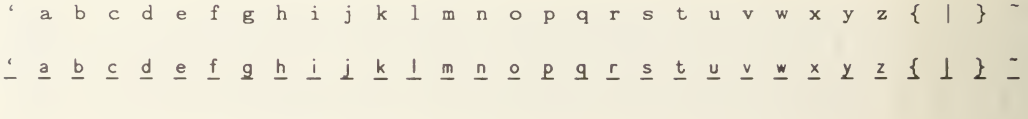
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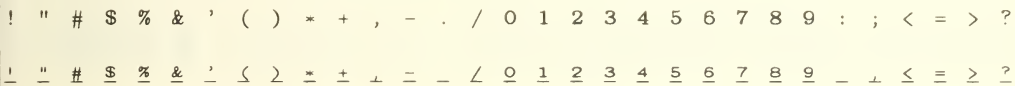

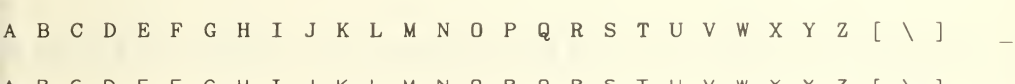

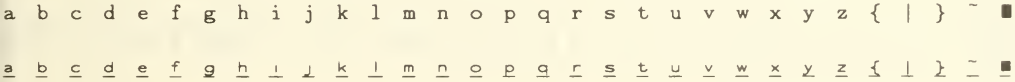

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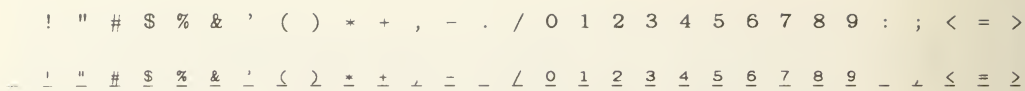

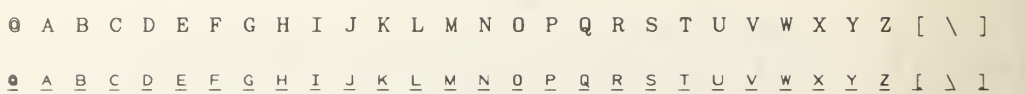

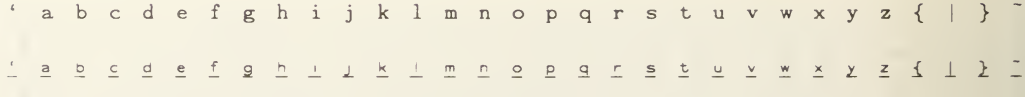

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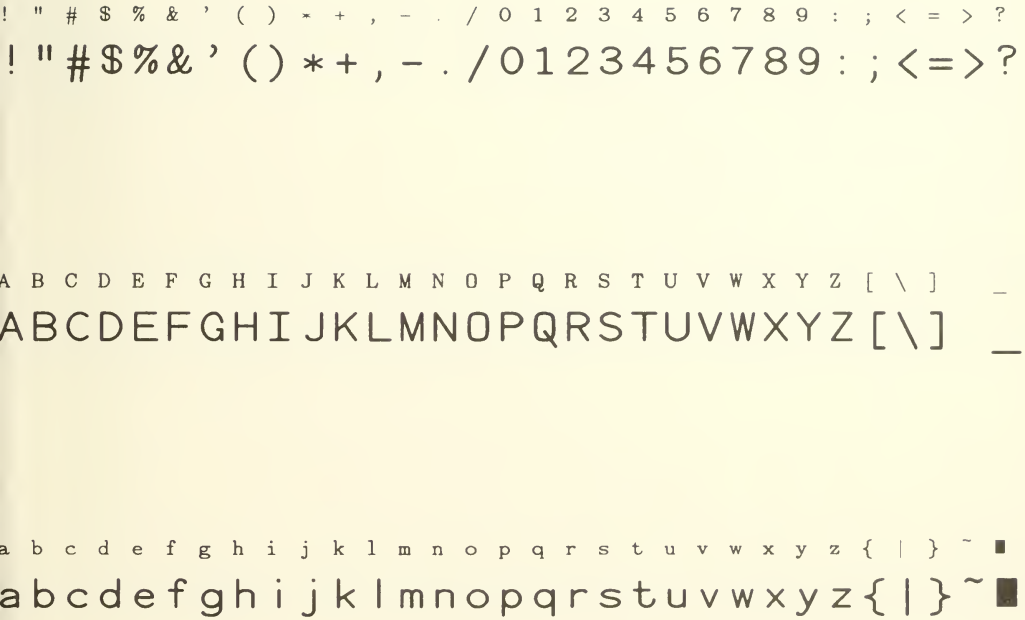
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a b c d e f g h i j k l m n o p q r s t u v w x y z { | } ~
abcdefghijklmnopqrstuvwxyz{|}~

! " # $ % & ' ( ) * + , - . / 0 1 2 3 4 5 6 7 8 9 : ; < = >

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A B C D E F G H I J K L M N O P Q R S T U V W X Y Z [\ ] _

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b c d e f g h i j k l m n o p q r s t u v w x y z { | } ~ ■

FONT 41

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` a b c d e f g h i j k l m n o p q r s t u v w x y z { | } ~ ■

FONT 42

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A B C D E F G H I J K L M N O P Q R S T U V W X Y Z [\ ] _

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@ A B C D E F G H I J K L M N O P Q R S T U V W X Y Z [\ ] _

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` a b c d e f g h i j k l m n o p q r s t u v w x y z { | } ~ ■

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" # $ % & ' ( ) * + , - . / 0 1 2 3 4 5 6 7 8 9 : ; < = > ?

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B C D E F G H I J K L M N O P Q R S T U V W X Y Z [\ ] _

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b c d e f g h i j k l m n o p q r s t u v w x y z { | } ~ ■

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FONT 46

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a b c d e f g h i j k l m n o p q r s t u v w x y z { | } ~ ■

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! " # $ % & ' ( ) * + , - . / 0 1 2 3 4 5 6 7 8 9 : ; < = > ?

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a b c d e f g h i j k l m n o p q r s t u v w x y z { | } ~ ■

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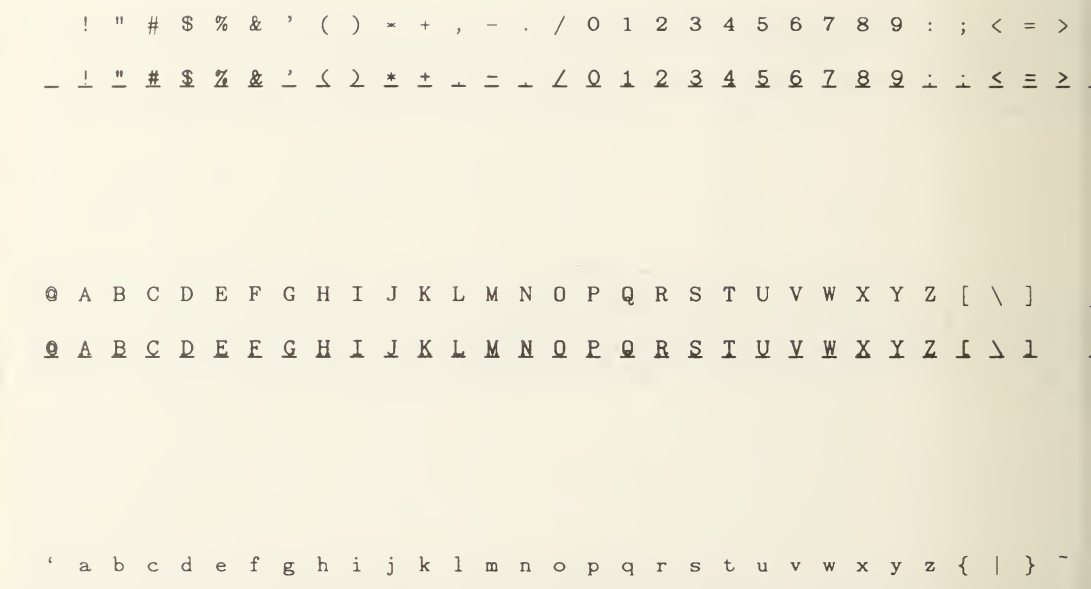
FONT 49



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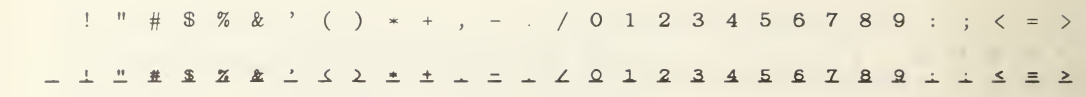

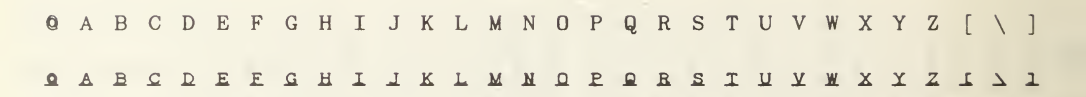

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a b c d e f g h i j k l m n o p q r s t u v w x y z { | } ~ ■

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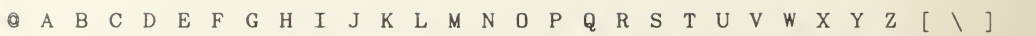
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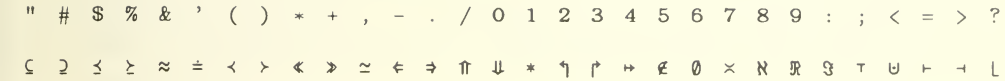

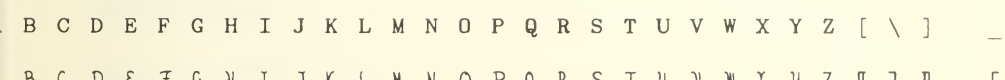

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FONT 60

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